REMARKS

The Final Rejection improperly maintains the rejection of claims 8-22 under 35 U.S.C. § 103 as obvious over the combined teachings of Blomquist (U.S. Pat. No. 6,004,410) and Langlet (WO 98/55428). The basis of the rejection is that if two compounds, "each taught for the same purpose, [is combined] to yield a third composition for that very purpose," then the third composition is *prima facie* obvious citing *In re Kerkhoven,* 626 F.2d 846, 859 (C.C.P.A. 1980). *See*, Final Office Action, page 3. Appellant questions the examiner's reliance and expansion of *Kerkhoven* for the reasons stated in the Response dated July 23, 1004, and further for the reasons stated below.

The patentability of an invention is dictated by 35 USC 103(a), and not by a generalized comment of one court opinion, i.e, *Kerkhoven,* which was made based upon the particular facts of that case. In fact, in twenty-five years the Court has not based a single obviousness determination on the reasoned comment stated in *Kerkhoven*. Instead, the court has consistently inquired whether the "differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art" 35 U.S.C. § 103(a).

It is well understood that a proper obviousness determination is best analyzed by the application of the so-called Graham factors. *Id.* A court must consider: (1) the scope and content of the prior art; (2) the differences between the claim invention and the prior art; (3) the level of ordinary skill in the art; and (4) certain secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1 (1966). There is no a shortcut to a proper analysis under 103, and that includes the *Kerkhoven* rationale put forth by the rejection. As stated in *Graham*, one begins a proper non-obviousness analysis with the teachings of the prior art.

Applicants and others of ordinary skill in the art of gas-generating compositions for air safety devices (ASDs) have recognized that the presently used compositions containing sodium azide as a fuel component and nitrocellulose as an oxidizer give rise to many safety, design and environmental problems. These problems, which are described in the application, are summarized as follows.

Sodium azide is not fully combustible resulting in the generation of hot solid particles that must be contained in specially reinforced fabric pouches. In fact, only 40% by weight of the sodium azide is responsible for gas-generation making it a highly inefficient material for use in ASDs. Consequently, there exist design limitations as to the weight and size of the ASDs. Nitrocellulose is a relatively thermally unstable compound which limits the service life of the ASDs.

Nitramine-based gunpowder compositions are presently being studied as potential replacement compositions for the azide/nitrocellulose compositions. However, they too have some unfavorable characteristics that need to be addressed. As stated in the application, the burn rate of nitramines depends upon pressure. If the pressure is too low, the burn rate is too slow to be an effective composition for ASDs. If the pressure is too high, the burn rate is too high, i.e., an explosive force is generated.

Blomquist (U.S. Pat. No. 6,004,410) describes a gas-generating composition for ASDs containing guanidine dinitramide (GDN) as a fuel component in combination with an oxidizer. The GDN "when combined with the oxidizer has a burn rate, at least 0.2 in/s at 2000 psi". Also, "when combined with the oxidizer and burned has a controlled increase in the burn rate with an increase in pressure" (col. 3, lines 5-12). Blomquist broadly states that the "oxidizer in the gas generating composition can be any oxygen releasing substance", and then goes on to list several oxidizers, e.g., the inorganic nitrates and perchlorates, metal oxides and metal complexes and mixtures thereof (col. 3, lines 63-67). However, there is no mention of the use of guanyl urea dinitramide as an oxidizer in any of the stated combinations.

Langlet (WO 98/55428) describes a new chemical propellant, guanyl urea dinitramide (GUD), and the use of GUD in ASDs. "GUD can be used as a propellant alone or as a component in a propellant compositions and can, in many applications, replace e.g., nitramine propellant" (page 2, lines 28-30). Although Langlet describes using GUD as a component in propellant compositions, no generic or specific combinations are described or listed, and no exemplary component compositions are provided. For completeness, Langlet also states that the GUD can be recrystallized from old propellant compositions and recycled (page 3, lines 19-25).

Beginning from the prior art above, Applicant discovered that of all the many different compounds that can be used as a gas-generating composition, the selection of a specific fuel component, GDN, and a specific oxidizer, GUD, provides a gas-generating composition particularly suited for ASDs. That discovery is embodied in claim 8, which is directed to a composition comprising GDN and GUD. While each of these two compounds was known *per se* and could be used as a component in a gas-generating composition, as reflected in the cited references, their specific use together has not been described in any of the prior art cited by the examiner. More importantly, there is no teaching or suggestion in the cited art, or in the art as a whole, that these two specific compounds should be selected from the vast array of available propellants, oxidizers and explosive compounds, in general, and combined.

As further support of the claims, there is no reasonable expectation of success (i.e., any benefit) taught by the art for the claimed combination. *In re Laskowski*, 871 F.2d 115, 117 (Fed. Cir. 1989)("[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification"). No such motivation to combine or expectation of success exists in the cited art. "There is no basis in the law ... for treating combination inventions any different than other inventions." *Fromson v. Advance Offset Plate, Inc.* 755 F.2d 1549, 1556 (Fed. Cir. 1985) (holding that the combination of three known separate process steps into a single step is nonobvious); *Brentingson Fishing Equipment Co. v. Shimano American Corp.*, 8 U.S.P.Q. 2d 1669, 1672 (Fed. Cir. 1988) ("the focus under section 103 is not whether each element in a claimed invention is old and unpatentable, but whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination."); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1549 (Fed. Cir. 1983) ("There is no [separate statutory] classification entitled 'combination patents.'") In all of these cases, the Court is telling us that a proper obviousness determination, even for combination inventions, requires a close examination of the facts particular to each case. Again, there is no shortcut for such an analysis.

The court has repeatedly struck down PTO and Board decisions rejecting claims under section 103 where there is no suggestion or motivation in the prior art to combine the teachings of the two or more cited references. This is especially true in the context of combination inventions. In such cases, the court often finds that the PTO and Board improperly asserted a *prima facie* case of obviousness based on the teachings of the Appellant's own disclosure. *In re Rouffet*, 149 F.3d 1350 (Fed. Cir. 1998).

As stated, Blomquist makes no mention of GUD, thus there can be no suggestion in Blomquist to combine GDN with GUD. Therefore the requisite suggestion must come from Langlet. However, a careful reading of Langlet does not provide such a suggestion. Langlet merely states that GUD can be a component in a gas-generating compositon, but with what other component or class of components? There is some suggestion that the burn rate of GUDN is comparable to nitrocellulose propellant, but that is all. Also, Langlet mentions several advantageous characteristics pertaining to GUD such as stability and lack of solubility in water, but nothing about if and how these characteristics are transferable to specific combinations of two or more propellants.

In addition, the facts presented by the claimed combination are not like the facts presented in *Kerkhoven*. In *Kerkhoven*, the Appellant claimed the use of separate streams, that is, stream A containing component A and stream B containing component B, and the introduction of the two streams into one or more spray driers. Claim 14 was generic to two different claimed processes: process (1), stream A is introduced into dryer A and stream B is introduced into dryer B (A and B are then physically mixed); and process (2), stream A and stream B are separately introduced into a single spray dryer. In both processes, the two streams are not mixed prior to their separate introduction into a spray dryer. The court affirmed the rejection under 103(a) as to process (1), but reversed the rejection as to process (2). The rejection to process (2) was reversed because there was no indication in the art how A and B would interact with each other when introduced separately into the one spray drier. The same can be said for the combination of GUD and GDN in a single composition.

The claimed compositions are also distinguishable from the cases that attempt to claim compositions comprising A, and B1 and B2, wherein both B1 and B2 were previously combined

with A individually, but not together as in a mixture. In the claims at issue, A (GUD) and B (GDN) were never previously combined.

Applicant, unlike others of skill in the art, recognized the shortcomings of prior gas-generating compositions. In particular, the application briefly describes many of these shortcomings, and then goes on to explain how the applicant arrived at his invention, and the many advantages associated with the inventive composition. For example, in contrast to the teachings of Langlet the applicant notes that GUD is "not all that suitable for use by itself as a gas-generating composition. GUD burns much too slow and generates too much carbon monoxide upon combustion. However, its relatively low rate of burn and its high thermal stability make it "particularly useful as a combustion modifier". Application, page 5, lines 3-26. Neither Blomquist nor Langlet recognize the use of GUD as a combustion modifier, more importantly neither suggest that one of skill should combine GUD with GDN. For the reasons stated, the rejection of claim 8 is improper, and applicant respectfully requests that the rejection be withdrawn.

In addition, the Office Action gives no patentable weight to the added limitation in claim 9 that GDN be the primary component in the claimed composition. The Office Action simply dismisses this concentration limitation stating that "optimizing a result effective variable is well within the expected ability of a person of ordinary skill in the subject art" (see Final Office Action, page 3).

There can be no question that the rejection of claim 9 is based on impermissible hindsight. Now not only must the person of ordinary skill come up with the selection of two compounds from a listing of many known propellants and oxidizers, but now that same person must decide that GDN be present in greater amounts than GUD. All of these decisions must be made from the teachings and suggestions of Blomquist and Langlet, which are simply not there.

Lastly, a careful examination of the burn rate (BR) vs. pressure (P) data reported in Fig. 1 also strongly supports the claimed combination. As shown, the burn rate is proportional to pressure according to the formula $BR = KP^n$, where K is a constant (the BR at P=0). The exponent determines how the burn rate is affected by changes in pressure. A relatively high n value indicates that a higher burn rate is achieved for a given increase in pressure (the slope is

steeper). Table 1 below lists the K values and n values for the GUD alone, GDN alone and the claimed compositions (the applicant is not claiming GUD alone or GDN alone) from FIG. 1. However, even before this data is discussed one must recognize that the data presented was not even available to one of skill in the art prior to the applicant's experiments and publication of this application.

From the data listed in Table 1 one recognizes a relatively linear relationship in the value of K for the compounds alone and in the respective claimed combinations, however, the value of n is not linear. As one moves from 100% GUD to 60% GUD the value of n dramatically increases from 0.72 to 0.86. This is an indication that the burn rate of the mixture is much more sensitive to an increase in pressure than GUD alone. If one then tries a composition with 40% GUD the n value then decreases back to 0.77. A composition with 20% GUD has an n value of 0.76 (very little change). In fact, there is little or no change in n for these two compositions compared to 100% GDN. From a practical matter, this tells one that the claimed compositions provide an unexpected rate of burn that is dependent upon the weight component of GUD and GDN in the claimed compositions. If one desires a relatively more stable gas-generating composition (with respect to an increase in pressure), then one would choose one of the claimed compositions with GDN > GUD. Alternatively, if one desires a higher burn rate at higher pressures, then one would choose one of the claimed compositions with GUD > GDN. All of these considerations must be taken into account in a proper 103 analysis.

Table 1

wt% GUD	n	K
100	0.72	1.5
80	0.87	1.4
60	0.86	2.0
40	0.77	2.9
20	0.76	3.7
0 (100% GDN)	0.77	4.0

For the reasons stated, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 20459-00346-US1 from which the undersigned is authorized to draw.

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Respectfully submitted,

By

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